

## **ATTACHMENT 5.1: WORK PLAN**

### **NORTH SEBP BASIN CHARACTERIZATION STUDY**

#### **PROJECT DESCRIPTION:**

##### **Scope of Proposed Project:**

One (1) deep boring will be installed at a location as to be selected to provide reference information for the northern portion of the South East Bay Plain (SEBP) Basin (in northern portion of SEBP GMP study area that is currently monitored sparsely). It is anticipated that the depth of the borehole will be 600 ft. +/- . In order to serve as a permanent monitoring fixture, a PVC piezometer will be placed in the well.

A map illustrating the approximate location of the proposed well as sited within the SEBP Basin is shown in Figure 1 in Appendix 1.

##### **The Project's Goals and Objectives as Related to Groundwater Management within the SEBP Basin:**

The location where EBMUD proposes to construct a monitoring well is located in the northern portion of the SEBP Basin (an area within which little is known regarding basin / aquifer properties). This activity, in combination with other projects as funded by this grant, will yield greater knowledge of the northern part of the South East Bay Plain basin, in particular an improved understanding of local hydrogeology (and especially deep aquifer properties) in the northern portion of the basin where existing information is sparse.

This effort will be to provide for a means by which water quality data can be collected in the future and a method by which to gather information that defines and delineates the aquifer in the northern portion of the SEBP Basin.

EBMUD anticipates that the standard suite of geophysical logs will be run during the boring exercise. Information collected, in combination with geologist's well log, will be used to design the monitoring well. Information will also document aquifer properties in the area.

Opportunities to locate the boring/monitoring well adjacent to existing production well(s) will be evaluated prior to the field work. Doing so may allow aquifer testing to be performed in future years (following monitoring well construction and development, as part of EBMUD efforts not associated with this grant application). Such testing will aid in analyzing opportunities for locating water supply and/or ASR facilities near or adjacent to the well site.

##### **Project Primary Tasks:**

The following paragraphs detail the primary tasks that will be performed as part of this project.

### **Task 1 - Select Monitoring Well Site**

EBMUD staff will work to identify a proposed location for siting the well. Existing hydrologic data as prepared as gathered for the preparation of the SEBP Basin GMP (which will be completed as of the Spring of 2013) will be used to help guide this process. Staff will spend time in the field to further refine the location (identifying where best a well could be sited such that it can be easily installed {where a drill rig can quickly be sited, where permanent access to the well can best be provided for, etc.}).

### **Task 2 - Obtain Easements and necessary permits**

Once a final, exact location is selected, EBMUD's in-house property section will provide assistance to staff in obtaining required easements. Easements may not be needed if an existing EBMUD property is found that can also accommodate the well. EBMUD has successfully negotiated easements for wells in the SEBP Basin as part of prior efforts, and we have assumed that that will continue to be the case. If, for some reason, an easement becomes too costly or cumbersome to negotiate, an alternate location for the well will be selected. Permits as required for this effort will revolve around well drilling activities (Alameda County Public Works Dept. has standards that must be adhered to).

### **Task 3 - Address CEQA Needs**

Based on EBMUD's knowledge of this general region of the SEBP Basin, our desire to install a well in an area within which there are no environmental impacts created, and our ability to slightly shift the well location if need be, the District believes that a categorical exemption would be possible. If a higher level of CEQA is needed, EBMUD's in-house staff of environmental planners are capable of providing permitting assistance.

### **Task 4 - Labor Compliance**

EBMUD has identified that it may be necessary to contract with a 3<sup>rd</sup> Party Labor Compliance Provider for the project effort. EBMUD would follow their in-house contracting out process to procure such a vendor. The 3rd party Labor Compliance Plan would be in place prior to drilling.

### **Task 5 - Prepare Plans and Specs**

EBMUD anticipates that a consultant will be hired to assist the District in developing the well's plans and specifications. As part of Task 5, the consultant will be responsible for developing documentation used to guide the drilling contractor and well installation permitting (through Alameda County Public Works Dept.).

### **Task 6 - Drilling:**

Well installation will entail specific tasks as follows:

### **Task 6.1 - Contractor Selection / Agreement**

The consultant hired to prepare plans and specifications will also be responsible for drilling contractor selection and for drilling supervision. EBMUD will review the contracts / agreements as proposed to be entered into by the consultant with their driller of choice to make sure that they adhere to District policies and procedures.

### **Task 6.2 - Construct Monitoring Well**

EBMUD anticipates that the well construction effort will take no longer than 20 days (likely considerably shorter, although there is time built into the schedule to address preconstruction meetings). As noted previously, EBMUD anticipates that the standard suite of geophysical logs will be run during the boring exercise. Information collected, in combination with geologist's well log, will be used to design the monitoring well. Information will also document aquifer properties in the area.

### **Task 6.3 - Sample Well**

The consultant will be asked to do a suite of water quality samples following the well's installation. Those samples will be tested for the suite of Title 22 water quality constituents. Standard EPA sampling protocol will be adhered to (sample storage, chain of custody, etc.)

### **Task 6.4 - WQ Analysis**

Samples collected will be sent to EBMUD's in-house water quality laboratory for testing. Additional rounds of water quality sampling will be performed as part of a separate project as funded via this grant. Water quality results will be submitted to the state for incorporation into the CASGEM program database.

### **Task 6.5 - Well Construction Report**

At the close of this work, a well construction report will be prepared by the consultant to document the effort. The report will house geotechnical logs, graphics illustrating well construction details, appendices containing water quality results, etc. That report will be provided to DWR as a deliverable.

## **ATTACHMENT 5.2: WORK PLAN**

### **NORTH GROUNDWATER LEVEL MONITORING SYSTEM IMPROVEMENTS**

#### **PROJECT DESCRIPTION:**

##### **Scope of Proposed Project:**

Dedicated water level monitoring instruments will be installed in five existing wells located within the City of Hayward municipal boundary. Instrumentation will be capable of logging (recording) data locally (at the well) and of transmitting data to a centralized database for use by groundwater basin managers (via download).

A map illustrating the location of the wells where instrumentation will be placed is shown in Figure 2 of Appendix 1.

##### **The Project's Goals and Objectives as Related to Groundwater Management within the SEBP Basin:**

Currently, there is no method in place to automatically read and record water level data in the City of Hayward's monitoring wells. There is a desire to install such a system within five of the City's wells, however, as it would allow for greater frequency of collection and further provide consistency with systems as currently in place within EBMUD's monitoring network (meeting the goal of this project, which would be to provide for added consistency and/or ease of monitoring).

Data collected will be used to record water level readings within the portion of the South East Bay Plain Basin that underlies their community. Having sound automated equipment will assure for reading accuracy / quality of data as collected. Having this system in place will provide information to augment the existing CASGEM monitoring program underway in the basin and will also be used to manage groundwater pumping in this critical area of the basin.

##### **Project Primary Tasks:**

The following paragraphs detail the primary tasks that will be performed as part of this project. Note that the City of Hayward is likely to hire a consultant to provide assistance through this effort.

##### **Task 1 - Prepare Monitoring Equipment Plans and Specifications**

The City of Hayward will work with EBMUD to gain information regarding the automated monitoring equipment that they currently have in place within their monitoring well network. It is envisioned that a compatible system will be installed within City of Hayward wells. Following that information exchange, the City will develop the required plans and specifications for procuring and installing monitoring equipment within the five (5) City owned wells.

## **Task 2 - Procure Equipment**

The City will follow their standard bid procedures to procure the monitoring equipment as prescribed the plans and specifications. Bid documents will be provided to the Department of Water Resources.

## **Task 3 - Install Equipment**

Based on the ease within which monitoring equipment was installed within EBMUD wells (which are similar in dimension / details as to that of the City of Hayward's), it is assumed that very little time and nominal effort will be required to install the system once procured. No permitting / no CEQA will be required.

## **Task 4 - Prepare and Issue Monitoring Equipment TM**

Following the completion of the installation, a technical memorandum (TM) will be prepared documenting the installation effort and providing details of the equipment. The TM will also summarize the process by which data is stored and accessed.

## **ATTACHMENT 5.3: WORK PLAN**

### **WATER QUALITY ASSESSMENT**

**(PORTION OF THE SEBP BASIN IN EBMUD'S SERVICE AREA)**

#### **PROJECT DESCRIPTION:**

##### **Scope of Proposed Project:**

Water quality samples will be collected from the new monitoring well within the portion of the South East Bay Plain Basin that lies within the EBMUD service area. Samples collected will be sent to EBMUD's in-house water quality laboratory for analysis. A summary laboratory report will be prepared that will be used for input into a basin-wide water quality database.

A project map illustrating the locations of the wells to be sampled is provided in Figure 3 of Appendix 1.

##### **The Project's Goals and Objectives as Related to Groundwater Management within the SEBP Basin:**

The Goal / Objective of this project will be to meet an ongoing need within the SEBP Basin to monitor and track changes in water quality and also to evaluate salt and nutrient concentrations within the groundwater basin proactively. As this project is a sampling exercise, there are no needed facilities and no permits / no CEQA.

As noted above, the data as collected will provide useful in that it will give Basin managers an ability to identify / track changes in water quality and to evaluate salt and nutrient concentrations within the groundwater basin proactively. Further, it will be provided to DWR as part of the CASGEM monitoring program submittal.

##### **Project Primary Tasks:**

The following paragraphs detail the primary tasks that will be performed as part of this project. As noted above, EBMUD will use its in-house laboratory to perform the water quality laboratory testing. However, EBMUD anticipates that a consultant may be used to collect the samples and send them to the EBMUD laboratory for testing.

##### **Task 1 - Prepare Sampling and Analysis Plan (For Spring and For Fall)**

EBMUD anticipates that the consultant will be asked to prepare a technical memorandum (TM) detailing the plans for the well sampling exercise. The TM will include the parameters to be sampled (which are anticipated to be the following Title 22 constituents: pH; Dissolved Oxygen; Specific Conductance; Turbidity; Temperature; Alkalinity, Total, in CaCO<sub>3</sub> units; Ammonia Nitrogen; Hardness, Total, as CaCO<sub>3</sub>; Hexavalent Chromium; Specific Conductance; Total Dissolved Solid (TDS); Total Organic Carbon (TOC); Turbidity; Orthophosphate as P (OPO<sub>4</sub>); Bromate; Chloride

Fluoride; Nitrate as N; Nitrate as NO<sub>3</sub>; Nitrite as N; Nitrate, Nitrite-N, Total Sulfate; Hydrogen Sulfide, Total Sulfide; Total Aluminum (dissolved); Arsenic (dissolved); Boron (dissolved); Cadmium (dissolved); Calcium (dissolved); Chromium (dissolved); Copper (dissolved); Iron (dissolved); Magnesium (dissolved); Manganese (dissolved); Potassium (dissolved); Selenium (dissolved); Silica (dissolved); Sodium (dissolved); Zinc (dissolved); Volatile Organic Compounds (Shallow Wells and Bayside Well); Total Trihalomethanes (Bayside Well); Chloroform; Bromodichloromethane; Dibromochloromethane; Bromoform; TTHM; Haloacetic Acids (Bayside Well); bromochloroacetic acid; monochloroacetic acid; dichloroacetic acid; trichloroacetic acid; monobromoacetic acid; dibromoacetic acid; Total HAA5.

## **Task 2 - Conduct Spring Sampling (Field Work)**

The consultant will follow proper well sampling and collection protocol as called for by the EPA and/or the State Water Quality Control Board. A two person sampling crew is assumed needed for this effort. EBMUD staff will be present in the field during a portion of this sampling as an observer and to QA/QC the consultant's work effort. Permits, if required for such activity as disposal of bailed well water, shall be the responsibility of the consultant. Said consultant may call on EBMUD's wastewater dept. to assist in proper disposal of bailed water if needed. No other permits and/or CEQA requirements are anticipated.

## **Task 3 - Perform Laboratory Analysis (Spring Collections)**

EBMUD's in house laboratory will be called upon to perform the laboratory analyses required. EBMUD's laboratory is certified and has set procedures that will be adhered to as based on the parameter tested for.

## **Task 4 - Issue Spring Sampling TM**

Once laboratory results are provided, the consultant will be tasked with issuing a technical memorandum document the results. That TM, once finalized, will be provided to DWR as a project deliverable. It is assumed water quality data would meet CASGEM reporting needs.

## **Task 5 - Conduct Fall Sampling (Field Work)**

The consultant will follow proper well sampling and collection protocol as called for by the EPA and/or the State Water Quality Control Board. A two person sampling crew is assumed needed for this effort. EBMUD staff will be present in the field during a portion of this sampling as an observer and to QA/QC the consultant's work effort. Permits, if required for such activity as disposal of bailed well water, shall be the responsibility of the consultant. Said consultant may call on EBMUD's wastewater dept. to assist in proper disposal of bailed water if needed. No other permits and/or CEQA requirements are anticipated.

## **Task 6 - Perform Laboratory Analysis (Fall Collections)**

EBMUD's in house laboratory will be called upon to perform the laboratory analyses required. EBMUD's laboratory is certified and has set procedures that will be adhered to as based on the parameter tested for.

#### **Task 7 - Issue Fall Sampling TM**

Once laboratory results are provided, the consultant will be tasked with issuing a technical memorandum document the results. That TM, once finalized, will be provided to DWR as a project deliverable. It is assumed water quality data would meet CASGEM reporting needs.

## **ATTACHMENT 5.4: WORK PLAN**

### **WATER QUALITY ASSESSMENT**

**(PORTION OF THE SEBP BASIN IN EBMUD'S SERVICE AREA)**

#### **PROJECT DESCRIPTION:**

##### **Scope of Proposed Project:**

Water quality samples will be collected from three City of Hayward wells within the portion of the South East Bay Plain Basin that lies within the City of Hayward's service area. Samples collected will be sent to EBMUD's in-house water quality laboratory for analysis. A summary laboratory report will be prepared that will be used for input into a basin-wide water quality database.

A project map illustrating the locations of the wells to be sampled is provided in Figure 4 of Appendix 1.

##### **The Project's Goals and Objectives as Related to Groundwater Management within the SEBP Basin:**

The Goal / Objective of this project will be to meet an ongoing need within the SEBP Basin to monitor and track changes in water quality and also to evaluate salt and nutrient concentrations within the groundwater basin proactively. As this project is a sampling exercise, there are no needed facilities and no permits / no CEQA.

As noted above, the data as collected will provide useful in that it will give Basin managers an ability to identify / track changes in water quality and to evaluate salt and nutrient concentrations within the groundwater basin proactively. Further, it will be provided to DWR as part of the CASGEM monitoring program submittal.

##### **Project Primary Tasks:**

The following paragraphs detail the primary tasks that will be performed as part of this project. As noted above, City of Hayward will send collections to EBMUD's in-house laboratory to perform the water quality laboratory testing. However, the City of Hayward anticipates that a consultant will be used to collect the samples and send them to the EBMUD laboratory for testing.

##### **Task 1 - Prepare Sampling and Analysis Plan (For Spring and For Fall)**

The City of Hayward anticipates that the consultant will be asked to prepare a technical memorandum (TM) detailing the plans for the well sampling exercise. The TM will include the parameters to be sampled (which are anticipated to be the following Title 22 constituents: pH; Dissolved Oxygen; Specific Conductance; Turbidity; Temperature; Alkalinity, Total, in CaCO<sub>3</sub> units; Ammonia Nitrogen; Hardness, Total, as CaCO<sub>3</sub>; Hexavalent Chromium; Specific Conductance; Total Dissolved Solid (TDS); Total Organic Carbon (TOC); Turbidity; Orthophosphate as P (OPO<sub>4</sub>);

Bromate; Chloride Fluoride; Nitrate as N; Nitrate as NO<sub>3</sub>; Nitrite as N; Nitrate, Nitrite-N, Total Sulfate; Hydrogen Sulfide, Total Sulfide; Total Aluminum (dissolved); Arsenic (dissolved); Boron (dissolved); Cadmium (dissolved); Calcium (dissolved); Chromium (dissolved); Copper (dissolved); Iron (dissolved); Magnesium (dissolved); Manganese (dissolved); Potassium (dissolved); Selenium (dissolved); Silica (dissolved); Sodium (dissolved); Zinc (dissolved); Volatile Organic Compounds (Shallow Wells and Bayside Well); Total Trihalomethanes (Bayside Well); Chloroform; Bromodichloromethane; Dibromochloromethane; Bromoform; TTHM; Haloacetic Acids (Bayside Well); bromochloroacetic acid; monochloroacetic acid; dichloroacetic acid; trichloroacetic acid; monobromoacetic acid; dibromoacetic acid; Total HAA5.

## **Task 2 - Conduct Spring Sampling (Field Work)**

The consultant will follow proper well sampling and collection protocol as called for by the EPA and/or the State Water Quality Control Board. A two person sampling crew is assumed needed for this effort. City of Hayward staff will be present in the field during a portion of this sampling as an observer and to QA/QC the consultant's work effort. Permits, if required for such activity as disposal of bailed well water, shall be the responsibility of the consultant. Said consultant may call on EBMUD's wastewater dept. to assist in proper disposal of bailed water if needed. No other permits and/or CEQA requirements are anticipated.

## **Task 3 - Perform Laboratory Analysis (Spring Collections)**

EBMUD's in house laboratory will be called upon to perform the laboratory analyses required. EBMUD's laboratory is certified and has set procedures that will be adhered to as based on the parameter tested for.

## **Task 4 - Issue Spring Sampling TM**

Once laboratory results are provided, the consultant will be tasked with issuing a technical memorandum document the results. That TM, once finalized, will be provided to DWR as a project deliverable. It is assumed water quality data would meet CASGEM reporting needs.

## **Task 5 - Conduct Fall Sampling (Field Work)**

The consultant will follow proper well sampling and collection protocol as called for by the EPA and/or the State Water Quality Control Board. A two person sampling crew is assumed needed for this effort. City of Hayward staff will be present in the field during a portion of this sampling as an observer and to QA/QC the consultant's work effort. Permits, if required for such activity as disposal of bailed well water, shall be the responsibility of the consultant. Said consultant may call on EBMUD's wastewater dept. to assist in proper disposal of bailed water if needed. No other permits and/or CEQA requirements are anticipated.

**Task 6 - Perform Laboratory Analysis (Fall Collections)**

EBMUD's in house laboratory will be called upon to perform the laboratory analyses required. EBMUD's laboratory is certified and has set procedures that will be adhered to as based on the parameter tested for.

**Task 7 - Issue Fall Sampling TM**

Once laboratory results are provided, the consultant will be tasked with issuing a technical memorandum document the results. That TM, once finalized, will be provided to DWR as a project deliverable. It is assumed water quality data would meet CASGEM reporting needs.

## **ATTACHMENT 5.5: WORK PLAN**

### **HYDROGEOLOGICAL DATABASE AND GROUNDWATER MODEL IMPROVEMENTS**

#### **PROJECT DESCRIPTION:**

##### **Scope of Proposed Project:**

An existing ArcHydro hydrogeological database will be augmented with new water quality data, water level data, pumping data, and lithologic data collected under this grant-funded program. Using that improved database, an existing groundwater model as prepared as part of the development of the South East Bay Plain Basin Groundwater Management Plan will be populated with this new, enhanced data.

A project map illustrating the limits of the SEBP Basin is provided in Figure 5 of Appendix 1.

##### **The Project's Goals and Objectives as Related to Groundwater Management within the SEBP Basin:**

The goal / objective of this project will be to incorporate data as collected from the five other grant-funded projects and use that information to update a Hydrogeological Database of the SEBP and further to incorporate elements of that updated database in the Groundwater Model as prepared via the GMP effort, thereby improving the model. The model covers the entire SEBP Basin.

The existing groundwater model prepared during the process of SEBP GMP completed the conceptual model set-up and incorporated a fundamental data set. However, having this newly collected, additional data set (as produced via the database improvement effort) will allow readings from 2009 to date to be used to enhance the accuracy of the model output and to calibrate the model such that it can more effectively be used. For example, it is envisioned that one key use of the updated model will be to review / analyze the impact(s) of future groundwater resources development within the basin area.

##### **Project Primary Tasks:**

##### **Task 6.1 - Hydrologic Data Base Improvements (including TM production)**

Under this project task, an existing ArcHydro hydrogeological database will be improved by populating water quality data, water level data, pumping data, lithologic data including soil texture and porosity as follows: Expanding the database to include a broad suite of analytical compounds and to include the service areas of both City of Hayward and EBMUD service areas; and evaluating well construction logs for key wells located through all services areas; and interpretation of soil texture and porosity and entry into ArcHydro.

This is an office exercise and hence no field work, permitting, or CEQA is required.

At the completion of Task 6.1, a technical memorandum will be produced summarizing the expanded database contents. That final version will be provided to DWR as a project deliverable.

### **Task 6.2 - SEBP Groundwater Model Improvements (including TM production)**

Under this project task, staff will update the groundwater model as prepared for the basin (which currently incorporates input datasets from up to years 2009). This model will be made available to all basin stakeholders taking part in the SEBP GMP effort, should they wish to have a copy for their records.

This is an office exercise and hence no field work, permitting, or CEQA is required.

A technical memorandum will be produced at the end of Task 6.2 detailing how the model was updated and describing how this additional information is of greater use to those wishing to utilize the updated model.